OTHER TRANSFORMATIONAL INITIATIVES

7

This chapter addresses specific transformational initiatives including: concept development and experimentation, science and technology, business practices, transformation path, interoperability, and supporting intelligence requirements. Addressed within each initiative are the associated Army initiatives and systems necessary to achieve future Joint transformational capabilities. Army actions for these transformational initiatives fully support DOD and Joint Transformation.

CONCEPT DEVELOPMENT AND EXPERIMENTATION (CD&E)—A JOINT AND ARMY PARTNERSHIP

The Army Transformation Concept Development and Experimentation Campaign Plan (AT-CDEP) establishes a campaign of learning to address our volatile, uncertain, complex and ambiguous future. It seeks to accommodate evolutionary and revolutionary changes in close coordination with our Joint, sister Service, industry and academic partners. It outlines key areas of conceptual and prototype investigation and exploration to develop a coherently joint Future Force. The Future Force is the operational force of the future—a continuously refined vision guiding the transformation of the Current Force of today to the strategically responsive, joint interdependent, precision maneuver force capable of meeting the future needs of our Joint warfighters across the full range of military operations. The lessons of history tell us that we can not entirely anticipate every aspect of future operations, or even our exact imminent requirements. The Army's challenge is to optimize our resources to fully meet the anticipated warfighting requirements of our Joint warfighters, while remaining fully prepared to both exploit and adapt to the unanticipated events that will inevitably change our future vision.

Concepts and Experimentation: Ideas to Insights

Our preparation for the future begins with ideas. Vision, strategic guidance, operational experience, and expert projections all serve as input for concept development and experimentation. Much of this input is incorporated into the Joint Operational Environment (JOE), a framework of threat capabilities and future environment elements first developed by the Army and now adopted by the United States Joint Forces Command (USJFCOM). Future warfare studies develop select ideas into military concepts.

A military concept is the description of a method or scheme for employing specified military capabilities in the achievement of a stated objective or aim. A concept describes the employment of future forces in all expected missions against adversaries within the expected operational environment. It also describes the capabilities required to fulfill the operational warfighting ideas described within the concept.

Military experimentation is the process of exploring innovative methods of operation, especially to assess their feasibility, evaluate their utility, or determine their limits. Experimentation may include wargaming and prototype development. Experimentation defines, refines, and substantiates concepts to a level that provides a relevant framework for capabilities requirements determination (Figure 7-1).

Our military concepts are in effect a conceptual "lens on the future," shaping our estimate of future capabilities for doctrine, organizations, training, materiel, leader development, people, and facilities (Figure 7-2).
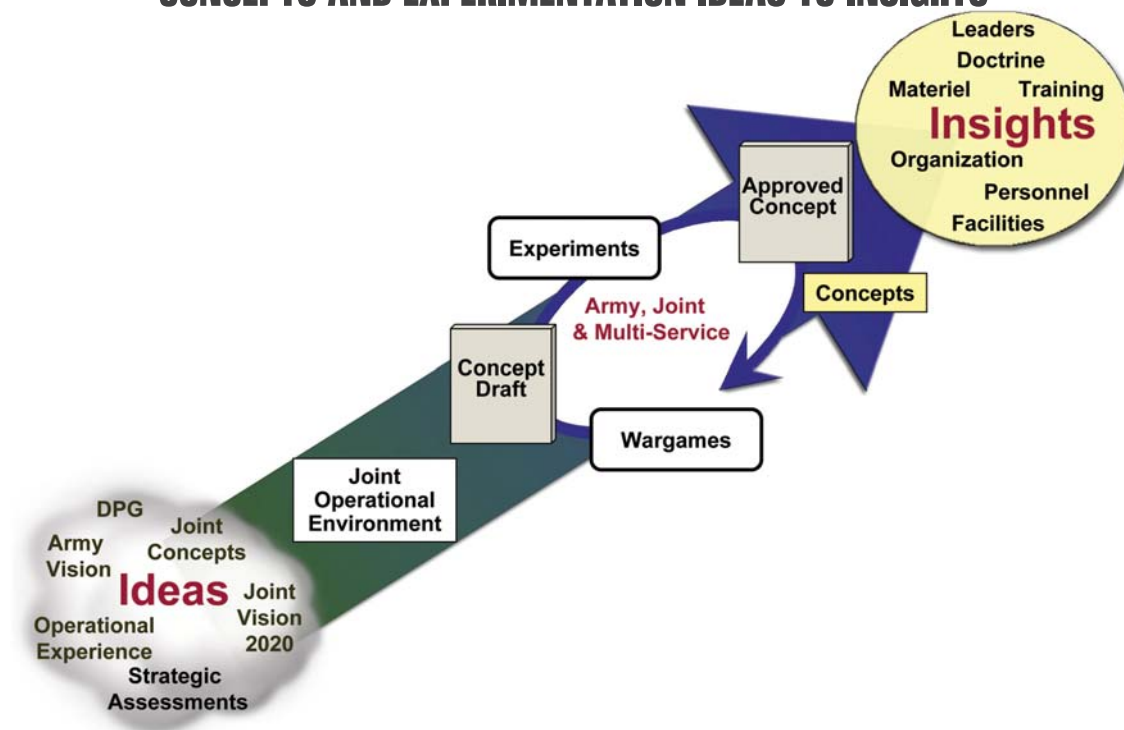
CONCEPTS AND EXPERIMENTATION IDEAS TO INSIGHTS

Figure 7-1. Concepts and Experimentation, Ideas to Insights

THE OPERATIONAL LENS
"Lens on the Future"

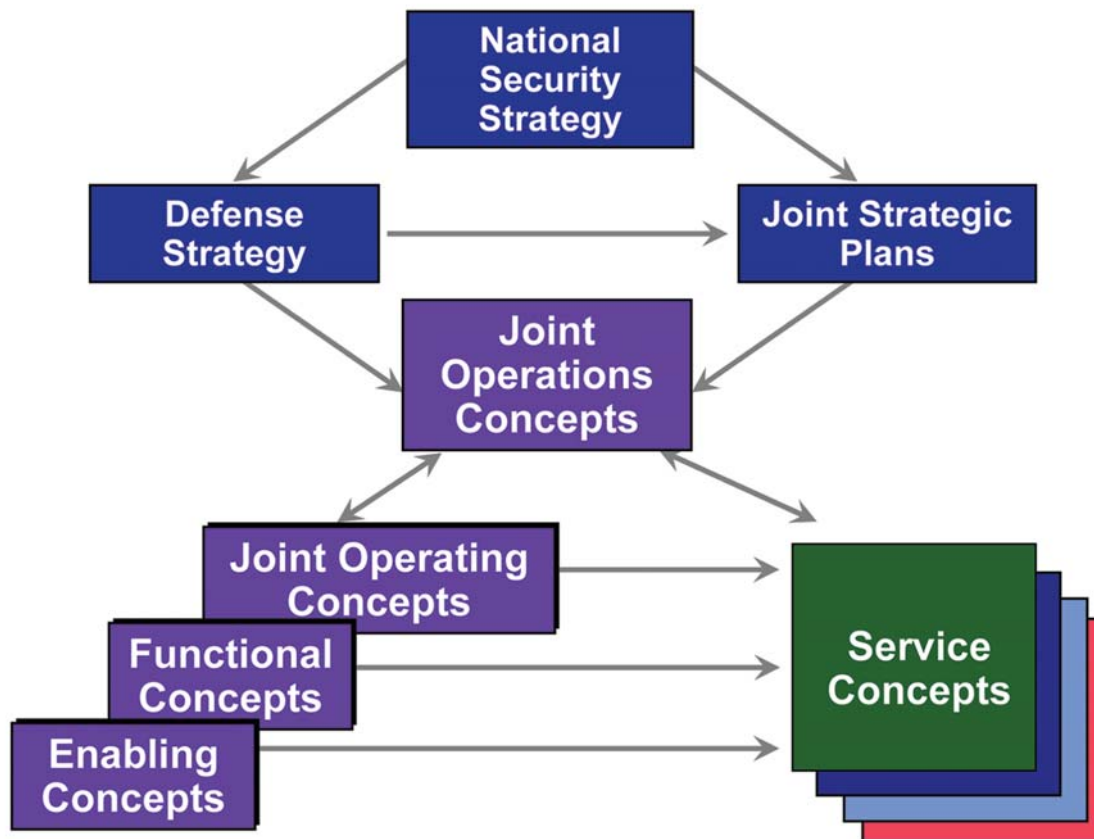Figure 7-2. The Operational Concept—"Lens on the Future"

Figure 7-3. Concept Hierarchical System

The Joint Context: Concepts and Experimentation

Army concept development and experimentation is firmly nested in a joint context. Joint concepts are organized in a hierarchical system: capstone, operating, functional, and enabling (Figure 7-3).

USJFCOM conducts Joint experimentation along two pathways: prototype and concept development. The prototype pathway is focused on developing capabilities in the near term to field a SJFHQ, and its enablers, in 2005. The concept development pathway is focused on determining actionable recommendations that result from collaborative experimentation with new concepts and capabilities in the next decade. (Figure 7-4).

The Code of Best Practices for Experimentation (DOD Command and Control Research Program, July 2002) describes three fundamental types of experiments: Discovery, Hypothesis Testing, and Demonstration. These reflect both different levels of anticipated and unanticipated results and differing levels of scope from single functional area/operational theme, to integrating across multiple functional areas and operational themes. Most of our experiments will fall into the category of discovery.

Joint experimentation employs one or more of the following common scenarios:

- Major Combat Operations against an inaccessible adversary who presents a global WMD threat

- Joint operations in urban environment

- Operations against a nonstate actor with significant regional combat capability, weapons of mass effect, and ties to global terrorist organizations

- Operations against a faltering or failing state that has regional weapons of mass destruction or mass effect capability

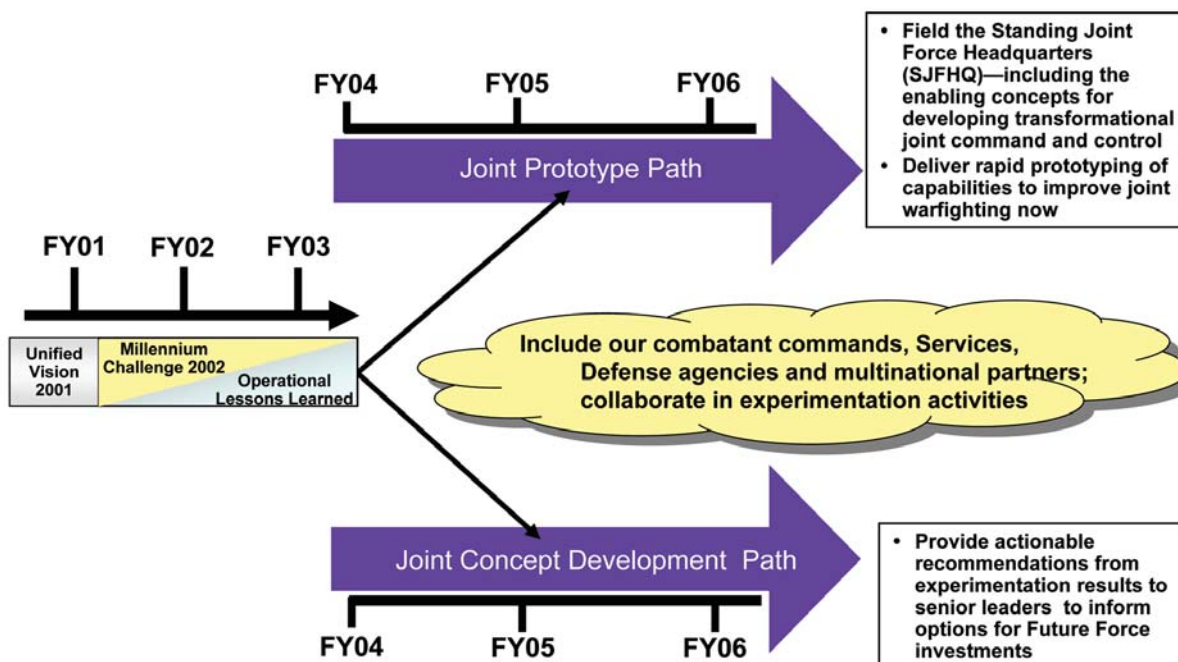# JOINT CONCEPT DEVELOPMENT AND "EXPERIMENTATION STRATEGY (FY04-05)

Figure 7-4. The Joint Concept Development and Experimentation Strategy

These scenarios are the basis for evaluating the Joint military challenges that were derived by USJFCOM. These Joint military challenges are categories of issues that USJFCOM uses as the basis for what gets studied at different experiments. In sum, Joint military challenges are:

- Achieving decision superiority
- Creating coherent effects
- Conducting and supporting distributed operations

Army Concept Development

As a key member of the joint team in a joint, concepts-based requirements system, the Army must develop an entire generation of warfighting concepts that support the joint effort. These concepts should follow from, among other factors, the body of joint concepts being developed. Army concept development utilizes the same hierarchical system as Joint concepts. The Future Force concept will serve as the Army's

Capstone Concept; the Army's Operating, Functional and Enabling Concepts are shown in Table 7-1.

The AT-CDEP identifies six foundational operational themes to focus concept development and experimentation efforts:

- Network-centric battle command
- Operational maneuver from strategic distances
- Entry and shaping operations
- Intra-theater operational maneuver
- Decisive simultaneous and distributed operations
- Sustaining continuous, simultaneous, and distributed operations

To facilitate collaborative concept development and experimentation, the USJFCOM Joint military challenges are mapped to the AT-CDEP's foundational operational themes: (Table 7-2)

Operating Concepts	Functional Concepts	Enabling Concepts
Unit of Employment	Battle Command	Maintenance
Unit of Action	Army Aviation	Transportation and Distribution
Army Special Operations	Maneuver Sustainment	Soldier Support
Force Projection	Maneuver Support	Supply and Services
Homeland Security	Fires and Effects	Medical
	Air and Missile Defense	Explosive Ordnance Disposal
	Space Support	Information Operations
	Protection	Soldier as a System
		Army Airspace Command and Control
		Intelligence, Surveillance and Reconnaissance
		Engineer Operations
		CBRNE Defense
		Non-Lethal Operations
		Military Police Operations
		Human Resource Support
		Legal Support Operations
		Financial Management Operations

Table 7-1. Army Concepts

Joint Military Challenges	Foundational Operational Themes
Achieving Decision Superiority	■ Network-centric Battle Command
Creating Coherent Effects	■ Entry and Shaping Operations
	■ Intra-theater Operational Maneuver
	■ Decisive Simultaneous and Distributed Operations
Conducting and Supporting Distributed Operations	■ Operational Maneuver from Strategic Distances
	■ Sustaining Continuous, Simultaneous and Distributed Operations

Table 7-2. Military Challenges and Operational Themes

The foundational operational themes are further defined into specific study areas for experimentation and analysis.

Network-centric battle command is a critical concept to enabling the Future Force operational concept. Battle command is the art and science of applying leadership and decision making to achieve success. It is the ability to make, communicate, and implement sound decisions, through superior knowledge, faster than the enemy can react, and at a controlled operational tempo. It enables commanders to lead Soldiers and synchronize all elements of combat power across echelons while on the move

and from any point in the battlespace. Battle command capabilities are the integrating backbone of the Future Force and will be essential across the entire spectrum of military operations. Consequently, the Future Force requires a revolutionary battle command architecture that is vertically and horizontally integrated (with linkages to current, Stryker, Joint, interagency, and multinational forces) from home station-industrial base to strategic, operational, and tactical units. Key study areas are:

- Decision making
- Situational awareness/understanding
- Sensors and information fusion
- Continuous joint interoperable network
- Organizational design

Operational maneuver from strategic distances (OMFSD) is the joint-enabled, rapid projection of Army formations by air and sea from points of origin outside the theater into the joint operations area, orchestrated and synchronized within the context of the entire joint force. Improved capability in this area will translate directly into increased deterrence for the future joint force, more rapid seizure of the initiative, and more rapid transition to decisive operations. The Army conducts OMFSD through the combination of mission-tailored, CONUS-based and forward-deployed forces, including pre-positioned stocks of equipment and supplies, when available, configured in force capability packages (FCP) to meet the specific requirements of each contingency. Army operational headquarters acting as the JTF HQ must be capable of planning and executing the overall deployment process in concert with the combatant commander. Key study areas are:

- Ways and means to achieve assured access
- Force deployment in combined arms configurations with integrated sustainment that permit immediate employment (deploy = employ paradigm)
- Closing the gap between early-entry and campaign forces to avoid operational pauses

- Use of multiple, unimproved entry points to increase force throughput, reduce predictability, and provide multiple operational options
- Strategic to tactical distribution
- Reduction in number of node transits and mode transfers required
- Lift capabilities that cross the strategic-operational seam to present forces in proximity to forward operating areas throughout the course of the campaign

Future Force formations will conduct **entry and shaping operations** to set the conditions for decision. Use of multiple unimproved entry points will help overcome enemy anti-access measures and increase the chances of achieving operational surprise or preemption. Ground forces will integrate fires, maneuver, protection, and information operations to ensure friendly freedom of action while denying the same to the adversary. The Future Force will also conduct forcible entry against critical objectives at any point in the campaign. Key study areas are:

- Employment/integration of joint interagency and multinational forces
- Destruction of enemy anti-access capabilities
- Intelligence preparation of the battlespace
- Building the strategic-to-tactical infospheres

Intra-theater operational maneuver is a key means to expand defeat mechanisms beyond sheer destruction. The Future Force executes joint-enabled operational maneuver by ground and air to extend the reach of the JFC and expose any part of the enemy force to destruction or dislocation. The advanced theater lift required to fully develop this capability will provide an invaluable improvement in the operational and logistical agility of the joint force overall. Key study areas are:

- Tactical vertical envelopment
- Assured mobility
- Vertical envelopment to operational depth

Once successful entry and shaping operations wrest the initiative from the enemy and begin to strip away his key capabilities, the Future Force conducts **decisive operations** to achieve accelerated decision through simultaneous, distributed operations, continuous operations at a controlled operational tempo, and direct attack of enemy decisive points and centers of gravity. Key study areas are:

- Decisive tactical combat (close fight)

- Simultaneous, distributed operations

- Multi-dimensional precision maneuver

- Pulsed logistics and transitions

- Survivability

- Networked lethality/precision engagement

The Future Force must **sustain continuous, simultaneous, and distributed operations**. Future Force sustainment will provide support across greater distances, conducting widely dispersed push-logistics-based operations. Sustainment commands within the Future Force must achieve the same degree of situational understanding as that of operational headquarters, while ensuring the COP fully supports commander priorities to optimize the efficiency of sustainment operations. Future Force operations will be effectively and efficiently sustained through distributed, transportation-based, globally networked, and reachback supported logistics capabilities. Key study areas are:

- Mission staging operations

- Adaptive organizations

- Pulsed sustainment

- Sustained operational availability

- Rapid and assured distribution

Army Experimentation

The end state of experimentation is a set of actionable recommendations to support key decisions based on analytically rigorous underpinnings, to yield the right set of integrated capabilities to enable the Future Force. The Army employs four categories of experiments: developmental, integrating, capstone, or exploratory. These reflect both different levels of anticipated and unanticipated results and differing levels of scope from a single functional area/operational theme, to integrating across multiple functional areas and operational themes.

All experiments are executed within a joint context and are conducted using approved scenarios and validated environmental, behavioral, and performance data. Consistent performance from experimental forces is attained via the Word-Class Blue Force and World-Class Opposing Force, in one of three experiment environments: virtual, constructive, or live.

All experimentation is bounded by analytic rigor to shape the experiment and concludes with analysis to document results. The study is a structured examination of a bounded subcomponent of a concept, using quantitative measures to answer specific research questions. It provides modeling to refine concepts and shape experiment design and execution, and also provides modeling to conduct sensitivity analysis and baseline extrapolation.

Experiment results are detailed in a series of documents with increasing levels of clarity. The first document, the Emerging Insights Report is completed within 14 days of each experimentation event and outlines the significant outcomes from the event. This document forms the basis of the Insight Action Plan, maintained by the Futures Center's Experimentation Division, which assigns responsibility for follow-up on insights. The second document is the Interim Report that is published no later then 30 days after a completed experiment plan, and provides an initial analysis of the insights from all events comprising the experiment. The final document, the Final Report, captures the analytical results from the experiment. Each of these documents is posted to the Experimentation Division's Army Knowledge Online (AKO) collaboration page to enhance dissemination and to provide a centralized, searchable repository of all experiment results.

Concept Development and Experimentation Campaign Plan

The three-phased CD&E campaign plan addresses the tactical, operational, and strategic perspectives of war, shifting the developmental focus over time. The first phase focuses on setting the conditions for achieving Future Force capability this decade. The initial focus is at the tactical level to rapidly develop the FCS-equipped UA as described in the UA organizational and operational (O&O) and FCS family of systems (FoS) Operational Requirements Document (ORD). As the

forts will ensure all concepts are thoroughly integrated in a joint context.

The second phase completes UA and FCS development but is focused on establishing the UE and its associated pooled capabilities. This phase also addresses joint integration across the entire force, to include the UA, Force XXI, SBCT and Current Force capabilities.

The third phase, 2015 and beyond, will be designed based on results of the prior phases. This phase acknowledges the continuing nature of transformation and will extend experimentation to address developments for the Future Force

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Phase 1 (2004-2008) Objectives

- Establish DOTMLPF solutions for FCS Increment I (2010-2018) and UA
- Develop and Refine UE Concept
- Integrate UA/UE within joint context
- Integrate Future Force and Joint operating, functional and enabling concepts by examination of operational themes

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Phase II (2009-2015) Objectives

- Support successful UA(-) IOC (2010)
- Support successful UA FOC (2012)
- Fully integrate UE/UA with Joint concepts and capabilities
- Establish DOTMLPF solutions for UE and FCS (Increment II)
- Establish UE (2012)
- Establish pooled capabilities for the force

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experimentation campaign progresses, the focus shifts to and remains at the operational and strategic levels to refine the operational UE concept and a broad range of functional concepts affecting the way we execute doctrine, build organizations and conduct training and leader development such as battle command, maneuver support, maneuver sustainment, fires and effects, and aviation. Throughout the phase, CD&E ef-

and beyond, while fostering learning organization behavior and innovation.

Opportunities and Alternatives

It is impossible—and imprudent—to project one singular path into the future at this time. The Army addresses the unanticipated future by constantly assessing, addressing, and exploiting changes in the operational environment, emerg-

ing technology and operational lessons learned. Many of these changes will modify planned development activities; the Army uses a "spiral execution" approach that garners emerging insights and lessons learned to rapidly adapt experiments and develop excursions (Figure 7-5). Yet, other changes may fall out of the scope of Future Force development; for example, alternative future force development paths or changes intended for near-term application. While these unanticipated events are by definition impossible to predict a priori, the AT-CDEP allocates a portion of the Army's CD&E resources to address alternatives on three principal axes:

- Future to Current
- Current to Future
- Current to Current

The need to be able to adjust our Future Force development along these three axes places a premium on highly flexible concept development and experimentation and persistent learning organization behavior. To leverage our ability to rapidly inform the Current Force from demands that are emerging from lessons learned and to quickly bring mature technologies that are realized during Future Force development, we must respond to regional combat commanders with rapid prototyping, field experimentation and modeling and simulations as required. We will pursue funding to support this effort (currently requesting $20M/year beginning in FY05). All proponents should examine and program within their budgets to accommodate this type of experimentation.

The execution of the AT-CDEP must routinely incorporate alternative thinking—the consideration of alternate operational environments, concepts, and capability solutions. The combination of resulting required capability sets will allow robust Future Force designs, with capabilities suitable for multiple anticipated environments. If resourced and adequately developed, concept development and experimentation should proceed along branches
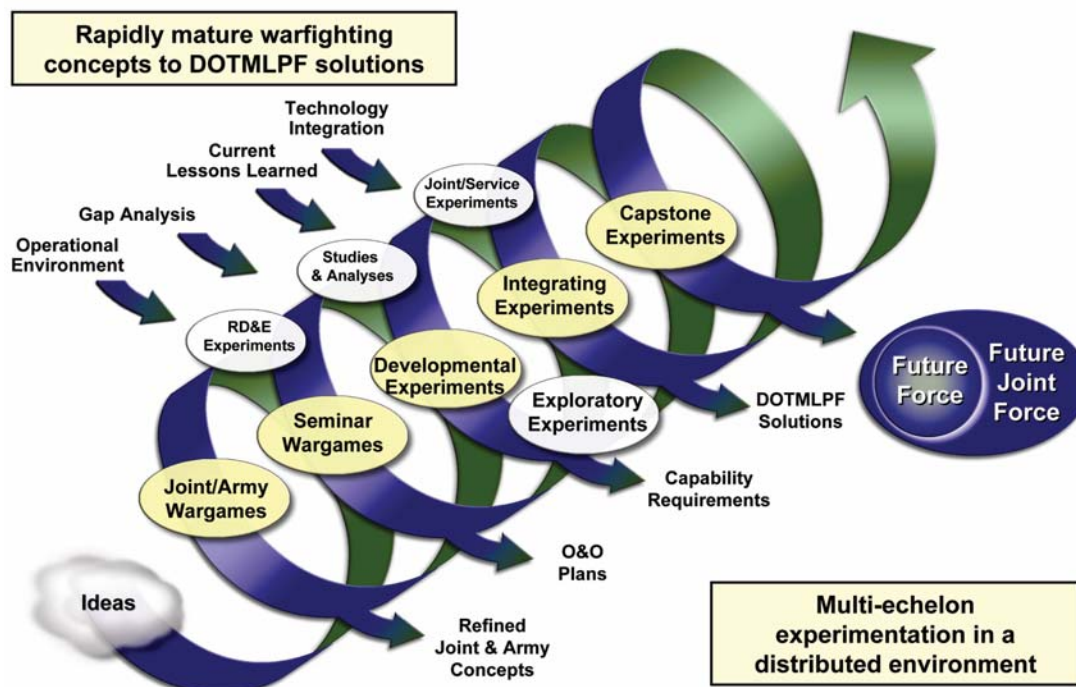
HOW THE ARMY LEARNS

Figure 7-5. How the Army Learns

and sequels, following permutations to give depth to our investigations.

Integration

The complex, integrated nature of the Future Force demands extensive integration of experimentation not only across DOTMLPF domains but also with other development efforts. Warfighting experimentation, S&T development, test and evaluation, and industry and academic efforts must synchronize experimental efforts to gain synergy from similarly focused events. To ensure integration of CD&E processes, TRADOC integrates via long-range campaign planning, semi-annual CD&E conferences, quarterly CD&E Colonel-level task force meetings, senior leader reviews, and collaborative venues for ongoing collaboration.

Joint

A key function of the AT-CDEP is inculcating a joint cultural mindset, both through collaborative CD&E and through experimentation with training and leader education. By collaboration with USJFCOM and sister Services, the AT-CDEP seeks to conduct born joint experimentation that will assist this cultural transformation. Training and leader education experiments will further contribute to realizing future warfighters proficient in joint concepts and operations—joint-centric training leads to a joint-centric mindset.

Future Warfare Studies and Wargaming

Future warfare studies are designed to generate, develop, and assess ideas about the conduct of military operations in the future joint operational environment (JOE). The study uses small, focused groups to develop or address a problem space for the purpose of generating ideas by looking at deficiencies (identifying the problem) or the need to address something more (e.g., new technology or capability) within the context of a future strategic and operational level setting. The studies develop and/or adopt ideas about military art, S&T, and human and organizational behavior, and they use a series of discovery and hypothesis testing experiments to assess the utility and feasibility of those ideas.

As the ideas mature and their utility and feasibility are established, the studies integrate them with developing and approved concepts and capabilities by demonstrating their utility through Joint and Service wargaming activities.

Science and Technology

Science and technology enable capabilities within the Future Force. Projected technology developments, projected into experiments, allow the experimenter to examine future possibilities. In concept work, by varying technology capabilities, alternative futures can be envisioned. In developmental work, performance parameters derived from credible technology projections provide realism, allowing combat developers to build Doctrine, Organization, Training, Materiel, Leadership and Education, Personnel, and Facilities (DOTMLPF) solutions around a set of technical capabilities. As technologies mature, actual software, middleware, and hardware prototypes can be used in experiments, validating both the technologies themselves and the DOTMLPF capability solution. This type of experiment can support both routine developmental efforts and, in exploratory experiments, cascading capability solutions for the Current Force.

Studies and Analyses

Studies and analyses support the Futures Center's concepts-to-capabilities work as the Army's architect of the future by providing organized analytic efforts to assist the investigation of emerging concepts, to inform experimentation, and to assist with deriving actionable operational insights. Implementing TRADOC priorities, study efforts examine DOTMLPF issues, force design plans, and weapons mixture allocation strategies. Using historical and ongoing studies, the Studies and Analysis Division, in coordination with the Experimentation Division, formulates a study strategy structured and

synchronized with the operational focus areas and candidate study issues presented in the AT-CDEP. The Studies and Analysis Division also provides a repository, the Automated Study Information System (ASIS), of study information, both emerging and final, to the study community. Once development is completed and migrated into a web-enabled, collaborative environment, ASIS will provide a single-point access for study efforts in support of experiments.

Modeling and Simulation

Modeling and simulation (M&S) are the tools that enable many aspects of the CD&E process. The spectrum of application of M&S includes tabletop map games, human-in-the-loop (HITL) simulations and simulators, closed-form M&S, and controlled field experiments involving live forces, constructive and virtual simulations. These tools provide the capability to achieve analytically rigorous underpinnings for refinement and evaluation of requirements and solutions.

Modeling and simulation can operate independently or can be networked from disparate sites. Army M&S communities, such as TRADOC and Research, Development and Engineering (RDE) Command, interface M&S to support inter-Service CD&E events. Support for the AT-CDEP may involve interfacing with USJFCOM, multi-Service, and multinational partners over configurable networks. The Battle Lab Collaborative Simulation Environment (BLCSE) is the key enabling environment to achieve the above.

Within TRADOC, the battle labs, schools and centers, and the TRADOC Analysis Center (TRAC) require standard experimentation, scenario generation and data development process to support Army CD&E efforts.

Modeling and simulation must continually evolve functionality to support AT-CDEP events. Focus groups, such as Focus Area Collaborative Teams, work to develop research plans so that the required functionality is present to properly

support future experimentation and analytic efforts. M&S must enable the Army and the Joint community to address key areas such as service data management, terrain generation, modeling the warrior, information sharing and battle command.

Battle Lab Collaborative Simulation Environment

The AT-CDEP optimizes available resources to ensure efficiencies of scope and to compress developmental timelines. A key enabler of this is the BLCSE. BLCSE enables experimentation in a persistent, distributed, linked environment with common data to reduce travel and facility costs while offering expanded opportunities, both in terms of frequency and additional player participation. Expanded frequency and participation facilitates rapid parallel development of subordinate and functional concepts at the TRADOC centers and schools, within the TRADOC battle labs, and with other commands and environments. Likewise, embedded collaborative testing (digital and live) on the part of TRADOC and U.S. Army Test and Evaluation Command (ATEC) ensures efficiencies by eliminating the need for redundant or repeated testing.

By connecting the BLCSE to USJFCOM's Distributed Continuous Experimentation Environment (DCEE), other Services, combatant commanders, allied nations, and various agencies may participate in Army experimentation as required, enabling the Army to refine concepts, identify required capabilities and explore promising insights in conjunction with its warfighting partners.

Devils Advocate and Red Teaming

By design, the AD-CDEP deliberately accounts for the credibility of the product through an ongoing devil's advocate review process both within the design of the plan itself and throughout execution. As the plan developed, it is vetted with senior active and retired military officers, USJFCOM, and members of the Army, Joint, and DOD staffs. During all phases of the campaign, experimentation efforts will undergo continuous

devil's advocate review and analysis to ensure experimentation goals and objectives are consistent with, and fully support the Army's Transformation goals.

SCIENCE AND TECHNOLOGY

The Army Science and Technology (S&T) Program is key to developing and achieving the transformational capabilities envisioned for Current and Future Forces. Transformation to the Future Force cannot be slowed while the Nation is engaged in the GWOT. Indeed, operations in Afghanistan and Iraq have validated the need for transformational change. The S&T Program has been shaped and focused to speed development of the key technologies that will enable a land combat force vital for decisive joint combat operations.

Most importantly, the Soldier system must remain at the center of both the Current and Future Forces. The primary technical challenges are to develop and mature the technologies to enable a lighter force with overmatching lethality that is survivable while simultaneously reducing logistics demands. To achieve this S&T strategy, the S&T Program is developing the following:

- Technologies and prototype systems for the Future Force—with the FCS as the cornerstone

- Innovative technology solutions to achieve leap-ahead or paradigm-shifting warfighting capabilities including:

  – Mobile, secure, self-organizing networks for seamless joint operations

  – Low-cost, multispectral sensors to find and identify the enemy

  – Stand-off and all-weather precision munitions (missiles and guns) for decisive results

  – Tunable lethality (solid state laser, high power microwaves, nonlethal weapons) for effects-based operations

  – Autonomous unmanned air and ground systems for increased survivability and reduced logistics

  – Immersive simulations and virtual environment technologies for Soldier, leader and unit warfighter training

  – Demand-reduction solutions for fuel, munitions, and water

  – Advanced collective and individual protective technologies, especially against biological and chemical weapons

The Army S&T Program has a dynamic portfolio of technology investments that is responsive to warfighter needs today and into the future. S&T seeks technological solutions that can be demonstrated in the near term, explores the feasibility of new concepts for the midterm, and seeks the imaginable for an uncertain far-term future.

More than 97 percent of the Army S&T Program is pursuing technologies that support the Future Force. FCS is the main thrust of the near-term S&T program and represents about one-third of all S&T funding. Other high payoff investment areas include C4 and ISR, unmanned air and ground systems, precision lethality, survivability and basic research for leap-ahead capabilities.

Path to Transformation

The S&T Program is the engine of change that pursues technology opportunities with the potential to change the nature of warfare. Careful stewardship of these resources identifies the appropriate balance in high-risk, high-payoff technologies for the far term and nearly mature technologies for the midterm, based upon military utility in the relevant time period. The portfolio mix among the near-, mid-, and far-term investments depends on both the urgency of warfighter needs and the maturity of enabling technologies.

The near-term priority (FY04-05) is on maturing and demonstrating essential technologies

for the Future Force, with major emphasis on the FCS. Technology investments in this time frame will provide the foundation for accelerated acquisition programs to field Future Force capabilities in this decade. Key areas of investment include precision lethality, integrated survivability, C2 + C2 + ISR, Soldier system of systems, semiautonomous air and ground robotic vehicles, human engineering, reduced logistics demands, Soldier training, mission rehearsal, and medical technologies. Advanced technology demonstrations provide mature technologies for rapid insertion into Army acquisition programs.

The midterm focus (FY06-12) is on developing and demonstrating technologies for follow-on increments to the FCS and other new capabilities for the Future Force. The Army will demonstrate and then incrementally integrate Advance Warrior into Land Warrior capabilities over the time period to complement networked capabilities in the FCS. Today's investments in applied research will provide technology transition products during the midterm in areas such as precision lethality, full-spectrum survivability, battle command on-the-move, advanced simulation, personnel technologies, and logistics demand reduction. Applied research activities focus on the development of components, models, and new concepts through in-house and industry efforts.

In the far term (FY13-20), Army investments in basic research this decade will facilitate revolutionary warfighting concepts. The products of these investments in areas such as nanoscience, biotechnology, smart structures, and compact power and energy sources will enable significant enhancements that maintain technological overmatch in land power forces in the next decade. The Army S&T Program collaborates with other Services and industry to mature advanced aerospace technology to develop intra-theater airlift to achieve operational imperatives of the Future Force. Basic research activities include all efforts of scientific study and experimentation focused on the understanding of fundamental phenomena with a high potential to significantly improve land power capabilities. In addition to Army laboratories and in-house research centers, academia and industry also conduct basic research.

To have an agile and innovative program, the Army also uses insights from independent, external examinations of the program. The Army's S&T community is a change agent for transformation and helps identify technology implications across the DOTMLPF domains.

TRANSFORMING ARMY BUSINESS PRACTICES

The DOD vision to improve business processes consists of a fully integrated knowledge environment that enables generation and sustainment of warfighting capability through a fully integrated logistics enterprise, based upon collaborative planning, knowledge management, and best business practices. The following examples highlight Army transformation of business practices. In general, the Army's strategy for business practices focuses on those unique functions necessary to generate prompt, decisive and sustained land power capabilities.

Army Logistics Enterprise Integration

The Army Materiel Command (AMC) has the mission to integrate all Army logistics functional requirements. AMC accomplishes this mission through a fully integrated digital data environment based upon operational logistics and systems architectures and best business practices within the government and commercial sectors. Logistics, financial, acquisition, and product data fuse together in an environment that operates in a near seamless fashion from the Soldier on to the Major Army Commands (MACOMs), Services, DOD, and industry. AMC maximizes worldwide networking capabilities, operating as a single virtual enterprise, to provide visibility of transactions throughout the end-to-end logistics process, while protecting from intrusions.

AMC published a high-level Army logistics operational and systems architecture called the Single Army Logistics Enterprise (SALE).

SALE provides a single point of entry with other business areas within the Joint community and across the Army. SALE will integrate and optimize business processes to provide commanders at all echelons with significantly improved capability to build and sustain combat power and maintain readiness. Access to near real time data facilitates a COP to instill confidence through information reliability, accuracy, and visibility.

Industrial Base Strategic Initiatives

Modernization of the industrial base is critical to support the Future Force and the FCS. The goal is a 21st century industrial base that consists of a complementary and synergistic mix of private sector and government industrial capabilities. Within that framework, the Army relies on the commercial industrial base and its capabilities to meet materiel requirements to the maximum extent practicable. The Army's organic industrial base consists of facilities that produce ammunition, store munitions, manufacture components, and maintain equipment. Accordingly, the organic industrial base strategy is diverse and specific to the different types of organic facilities such as ammunition plants and storage depots, manufacturing arsenals, and maintenance depots. Across all three types of facilities is a common emphasis on implementing lean philosophy and on pursuing public-private partnerships to improve efficiencies, optimize utilization, and upgrade core capabilities.

Ground Systems Industrial Enterprise (GSIE)

The GSIE is an initiative of the Tank-automotive and Armaments Command (TACOM). TACOM operates as a single business unit while efficiently utilizing core capabilities of Anniston Army Depot, Watervliet Arsenal, Red River Army Depot, Lima Army Tank Plant, Rock Island Arsenal, Sierra Army Depot, and other installations supporting AMC. GSIE simultaneously transforms the core capabilities at those specific installations to meet the needs of Army Transformation while it fosters additional partnering arrangements with industry and the

field. The Army implemented GSIE on a provisional basis on 10 October 2002.

Performance Based Logistics (PBL)

This initiative, which capitalizes on the Performance-based Business Environment (PBBE) concepts, is part of the Office of the Secretary of Defense (OSD) Acquisition Reform. It emphasizes solutions as opposed to process. In other words, the goal is to specify what is wanted and not how to accomplish that goal. The Total Life Cycle Systems Manager (TLCSM), the Program Manager (PM), negotiates Performance Based Agreements (PBAs) with the customer and Product Support Integrator (PSI). In support of the PM's PBA with the customer, the PM negotiates a PBA with the PSI who in turn negotiates with support providers. AMC, as the sustainment manager for the Army and in support of the PM, assumes the lead for integrating PBL support concepts and other Combat Logistics System (CLS) instruments to assure the customer receives integrated sustainment support. AMC initiates agreements with the Army Acquisition Executive, solidifying integration of the PM's TLCSM responsibilities with AMC's sustainment management responsibilities. Quarterly weapon status reports (WSRs) and reviews of systems of systems planning provide oversight and quality control.

Simulation and Modeling for Acquisition, Requirements, and Training (SMART) Initiative

The next generation of Army M&S will allow the Army to address the Future Force within the framework of emerging joint concepts. Modeling and simulation enables the up-front effort that leads to a better understanding of the required capabilities of the Future Force.

The Army will capitalize on the SMART Initiative to more quickly provide solutions for the Future Force. SMART is designed to provide a framework for a disciplined, collaborative environment to reduce costs and time required to provide solutions to Army needs. SMART ex-

ploits M&S tools and technologies to address system development, operational readiness, and life-cycle cost. This is accomplished through the collaborative efforts of the acquisition, requirements, training and operations communities.

Experimentation, analysis, and testing through SMART will form an important component of the development strategy for the Future Force and FCS. Analytical models will evaluate the cost-benefit of acceptable and feasible options to identify the preferred alternative that meets the needs for Future Force design, development, and acquisition. Modeling and simulation as well as the testing infrastructure will evaluate component, system, and system-of-systems capabilities to meet identified performance requirements.

Emerging and future concepts will employ technologies, unit constructs, tactics, and procedures unlike those of today's Current Force. Using existing M&S tools and creating M&S tools to develop and analyze these concepts allows developers and engineers to refine concepts and designs in the virtual environment at a much faster pace with the benefit of more iterations. Under the SMART Initiative, M&S investments in the areas of advanced concepts and requirements, life-cycle cost models, and embedded and enhanced training simulations will reduce risk and identify, support, and transition M&S leap-ahead and high-payoff opportunities.

Innovative Prototyping Methodologies

As previously discussed, the Army uses operational prototyping for organizational concepts and technologies. In the area of virtual prototyping, the Army leverages ever-increasing computer capabilities and the digital transformation occurring in numerous industries to reduce time required to conceptualize, design, engineer, test, evaluate, and manufacture new products in a synthetic, virtual environment with computer-based M&S. The following are some strategies illustrating the diversity of approaches:

- **The Future Combat System (FCS).** The use of M&S underpins the prototyping methodology to be utilized in the development and test and evaluation (T&E) of the FCS.

- **Rapid Prototyping: The Rapid Aerostat Initial Deployment (RAID).** Rapid prototyping was proven effective in Operation Enduring Freedom to solve an urgent theater requirement for an enhanced capability to detect and identify threat movement at sufficient distances to enhance tactical decision making. The Joint Land Attack Cruise Missile Defense Elevated Netted Sensor System (JLENS) Project Office identified a low-cost materiel solution to fill this operational need within 30 days.

- **Integrated Product Team: The Patriot Battle Command Post (BCP)**. The need was identified for a Patriot BCP to meet May 1998 Operational Requirements Document (ORD) threshold requirements in several categories. The government was established as the prime integrator for program execution, and tasked with developing the system segment specification. The program was managed using a government-led Integrated Product Team (IPT) supplemented by multidisciplinary sub-IPTs. This approach proved to be significant risk mitigation by providing users functional disciplines (e.g., system engineering, software, test and evaluation, safety, quality) and other stakeholders early input to the design. This approach significantly reduced schedule and cost, with the first five units being delivered to the user in less than two years from the initial concept.

INTEROPERABILITY

This section focuses on the Army's process and structure for achieving joint, interagency and multinational interoperability. Interoperability is an important enabler across the JOCs for Joint Force operations. U.S. allies and prospective coalition partners are eager to maintain interoperability with the Army as it transforms.

The TPG states, "It is in our interest to make arrangements for international military cooperation to ensure that rapidly transforming U.S. capabilities can be applied effectively with allied and coalition capabilities." A component of the Army's interoperability goal is to ensure that these select military forces keep pace with Army Transformation and avoid unnecessary degradation in multinational force compatibility. The Army International Activities Plan (AIAP) focuses on crafting mutually beneficial army-to-army relationships with those countries that are contributing to U.S. Army missions or are most likely to do so in the future. AIAP uses senior leader and bilateral staff talks; American, British, Canadian, Australian Armies Standardization Program (ABCA) and North Atlantic Treaty Organization (NATO) standardization activities; and other venues to influence foreign planning and programming decisions, exchange information, leverage advanced technology, and share lessons learned.

Participation in the Joint Technical Architecture Collaborative Environment

A key enabler to transforming DOD is an interoperable Joint Force that is dominant across the entire spectrum of military operations. The Joint Technical Architecture provides that collaborative environment for all Service systems. Joint Technical Architecture-Army (JTA-A) is the comprehensive set of baseline standards required for Army and Joint interoperability—it is

the set of building codes upon which Army command, control, communications and computers/ information management (C4/IM) systems are based.[21] The JTA-A ensures C4/IM related systems and products meet interoperability, performance, and sustainment criteria, and provides the technical foundation for a seamless flow of information and interoperability among all systems that produce, use or exchange information electronically. The JTA-A mandates standards and guidelines for system development and acquisition that may dramatically reduce cost, development time and fielding time for improved systems.

The Army's Chief Information Officer (CIO)/ G-6 is the Army's Technical Architect and is responsible for development of the JTA-A and the validation and integration of all technical architectures into the Army Knowledge Enterprise (AKE) architecture. On 1 July 2003, the Army's CIO/G-6 implemented a zero-tolerance approach to technical architectural compliance across the Army.[22] All AC, RC and National Guard C4/IM systems were required to register in the Army Information Technology Register by 31 December 2002, and must comply with the JTA-A by 30 September 2006.

Rigorous Testing and Evaluation

To verify compliance, the Army's CIO/G-6, in coordination with the U.S. Air Force, established the Army's Net Worthiness Certification Process on 2 April 2003.[23] The Net Worthiness

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[21] Department of Defense Directive, *Interoperability and Supportability of Information Technology (IT) and National Security Systems (NSS)*, 11 January 2002; Title 40 USC. (Clinger-Cohen Act of 1996), Chapter 25; Title 10 USC, Sections 133, 2223, and 2224; Army Regulation 25-1, *Army Information Management*, 31 May 2002.

[22] Army Knowledge Management Implementation Plan, 5 February 2003, para. 2-2 c. 1.

[23] Department of Defense Directive, *Interoperability and Supportability of Information Technology (IT) and National Security Systems (NSS)*, 11 January 2002; DOD 8510.1-M, *DOD Information Technology Security Certification and Accreditation Process (DITSCAP) Application Manual*, 31 July 2000; DODI 5200.40, *DOD Information Technology Security Certification and Accreditation Process (DITSCAP)*, 30 December 1997; Secretary of Defense Memorandum, *Defense Acquisition, Attachment 2, Operation of the Defense Acquisition System*, 30 October 2002; *Interim Defense Acquisition Guidebook* (formerly 5000.2-R), 30 October 2002; AR 25-1, *Army Information Management*, 31 May 2002; AR 70-1, *Army Acquisition Policy*, 15 December 1997; AR 73-1, *Test and Evaluation Policy,* 7 January 2002; AR 380-19, *Information Systems Security*, 27 February 1998; Army Enterprise Architecture Development Plan (AEADP), Version 2.1; CIO/G-6 Memorandum, A*rmy Net worthiness Certification*, 8 April 2002; and CIO/G-6 Memorandum, *Net Worthiness Certification Program*, 2 April 2003.

Certification Process checks for JTA-A compliance, ensures a coordinated network-centric information structure, and verifies that all C4/IM systems on the Army Network are certified as to the capabilities, limitations, and potential impact to the AKE. The process also applies to all Army Active, Reserve, National Guard, DOD, joint, combined, federal, non-DOD, and coalition weapon and information systems, national security systems, and all infrastructure programs that use or have interoperability requirements with the Army Enterprise Infrastructure (AEI). Net worthiness identifies and mitigates risk to the AEI by assessing whether it can support the C4/IM system; if there is a negative impact to existing C4/IM systems, if the C4/IM system introduces any security vulnerabilities, and if the C4/IM system can be managed and sustained.

Incorporation of IP-based Protocols

To ensure that acquisition of C4/IM systems is consistent with GIG policies and architecture, all future systems will be compliant with DOD-established IP-based protocols. Critical components of effectively implementing Internet protocols are the selection of protocol profiles and when they will be implemented in each system. The protocol profiles determination and implementation are managed through the software blocking process (SWB) as described in the next section.

Achieving Interoperability

Systems are developed and managed by independent organizations. This can lead to significant interoperability problems when systems are delivered and have to operate in a system of systems (SoS) environment. The Army's solution to manage this and the varied dependencies between individual system programs is the SoS SWB. The SWB process is designed to facilitate the development and sustainment of SoS interoperability, across hundreds of programs, in support of Army Transformation. This is achieved through a robust dynamic collaborative process of information sharing and issue resolution managed by a flexible tiered set of integrated forums.

Achieving Capabilities to Post Before Processing

JFCs have four fundamental requirements for intelligence and information. Those requirements are: timeliness, correctness, precision, and assured access. The concept of post before process is an attempt to satisfy the timeliness requirement and, as a second order effect, places conditions on the assured access requirement.

Post before process is more accurately stated as tasking, posting, processing, and using (TPPU), and describes the intelligence process from intelligence requirements definition to the commander's decision to take action based on receipt of data, information, or knowledge-based products. This concept is a redefinition of the previous concept of tasking, processing, exploiting, and disseminating (TPED) initiated by the then Assistant Secretary of Defense for Network and Information Integration (ASD-NII). The process change was intended to address the issue of latency. The hypothesis is that by posting the raw data first, it would be simultaneously available to multiple users (i.e., commanders, shooters and analysts) to be used for multiple purposes. Acceptance of the information is based on confidence gates defined by the user.

For each user, latency would then be defined only as the time necessary to post the data or information to a product library where it can be accessed. This is especially true for information collected electronically, such as electronic intelligence (ELINT). It becomes more problematic when other data sources are considered, such as communications intelligence (COMINT) internals; imagery, both electro-optical (EO) and synthetic aperture radar (SAR); and, in some cases, HUMINT reporting where, in the absence of advanced analytical tools, some human analysis is required to make the data understandable. The Army intelligence community endorses the concept of TPPU, but understands that post before use is a complex concept because there are

many levels of data, products and information to be posted. There is raw data, which is the type most commonly referred to in TPPU discussions. There is also fused data, fused information, and finished products. Each posting is used differently based on the ability of the end user (decision maker, shooter, or analyst) to handle the data and the intended use of the data.

A fundamental concern is the lack of a standardized procedure/process for identifying to users what is raw data and what is processed information. Establishing standards across the intelligence and user communities will assist commanders in defining their confidence gates as mentioned above.

The principal Army intelligence concern with the post before processing concept is to ensure that it addresses both targeting and achieving situational understanding. Often, when discussing post before processing, there is a tendency to focus on targeting, almost to the exclusion of discussions about achieving situational understanding. For land forces, it has to be more than simply putting a crosshair on a target, i.e., content counts. Commanders need to understand what it all means. In the future, commanders will need to understand beyond the traditional three questions of "Where am I?" "Where are my friends?" and "Where is the enemy?" to answer the questions "What is the enemy doing now and what will the enemy do in the future?" So in any discussion regarding posting before processing, it must be clear that data does not equal knowledge and posting does not equal understanding. Without proper analysis, a COP could be a casualty of post before process.

Post before process promises to reduce latency and may allow quicker and more independent action. The Army accepts this premise and embraces the intent behind it. Since an unconditional adoption of this principle can conceivably defeat the purpose for which it was instituted, the Army will balance its implementation of post before process based on the outcomes from experimentation.

SUPPORTING TRANSFORMATIONAL INTELLIGENCE REQUIREMENTS

As the larger Defense intelligence community transforms, the Army plays a major part in developing investment strategies, business processes, and positioning of resources to carry out the mission of producing intelligence that supports tactical operations and ensures information superiority. The Army ensures that the needs of the tactical commander are protected during Defense intelligence transformation.

Army Intelligence Transformation represents a fundamental change to the way the Army thinks about and performs intelligence collection, analysis, production, and dissemination. The core of this transformation effort evolves traditional intelligence reporting to the creation of understanding. This transformation focus emphasizes the cognitive requirements of knowledge creation. Intelligence Transformation changes the focus from systems and processes to solutions that improve the warfighters' knowledge and understanding of the battlespace. The overarching principle is that fused intelligence and assessment capabilities provide dominant knowledge to the commander at the point of decision. Dominant knowledge enables precision application of effects through informed decision making and predictive cognizance. Intelligence Transformation will deliver high-quality and timely intelligence across the range of military operations. Army intelligence provides the threat, gray, and environmental characterization components of the COP.

Fundamental to achieving this new capability is developing actionable intelligence that is warfighter-centric, specific to the needs of the decision maker across the full range of military operations. Actionable intelligence empowers greater individual initiative and self-synchronization among tactical units—accelerating the speed of decision making. The collaborative analytical environment that encompasses Joint Force organizations and analytical centers from national to tactical echelons enables the fusion of

information across the force and supports action-able intelligence.

The intelligence challenge is to redefine Army intelligence so that every Soldier is both a contributor to and a consumer of the global intelligence. Soldiers in the performance of their duties contribute to the intelligence network and in turn receive actionable intelligence tailored to their missions. While tactical commanders nearest to the fight can leverage modular, tailored packages to develop intelligence, they are also supported by a grid of analytic centers focused on their intelligence needs. This will require a change in the Army-wide culture and mindset. To achieve this end, Army intelligence pursues six fundamental ends that are aligned within the three components of the overall Army Transformation Strategy.

Transform Culture

- Change Army Intelligence Culture—Create a campaign-quality, joint, and expeditionary mindset through doctrine, operational and personnel policies, regulations, and organizations to develop intelligence professionals competent from "mud to space" who know "how to think" and are focused on the commander at the point of decision

Transform Processes—Risk Adjudication Using the Current to Future Force Construct:

- Fix Training—Reshape training to provide the volume, variety and velocity of intelligence and non-intelligence reporting

- Rapid Technology Prototyping—Develop an agile technology enterprise that enables the intelligence force to respond to a learning enemy with the best technical solutions available in real time

Transform Capabilities Through Force Transformation:

- Create the Framework—Create an information and intelligence grid inherently joint, providing COP, universal visibility of assets, horizontal and vertical integration, and situational understanding, linking every "Soldier as sensor and consumer" to analytic centers

- Enhance Tactical Echelons—Provide robust, flexible, modular, all-source collection and analytical capabilities, born joint, and part of a tactical force—capable of independent action but empowered by linkages to a global grid and analytic and collection overwatch

- Transform HUMINT and Counter-Intelligence (CI)—Grow a CI and HUMINT force with a more tactical focus that provides more relevant reporting

To achieve these objectives, Army intelligence is making changes across the DOTMLPF domains. These changes include the following:

PEOPLE AND LEADERSHIP

People remain the centerpiece of Army Intelligence Transformation. The cultural and mindset changes identified above as essential to intelligence transformation begin with a highly trained, motivated, professional intelligence corps of Soldiers, civilians, and contractors.

The Army develops regional experts capable of understanding and predicting adversary actions. The Army resources the institutional training base with current expertise and experience to assure the development of leaders and Soldiers through all phases of the professional military education system. The Army must also develop and nurture intelligence professionals competent from mud to space who know how to think and focus on commanders' requirements at the point of decision.

DOCTRINE

Changes to the way Army intelligence operates begins with changes to its culture. The creation of a campaign-quality force with a joint and expeditionary mindset pervades doctrinal, operational and personnel policies, regulations and organizations. The Army remains cognizant

of evolving operating concepts within the joint and national intelligence communities to ensure the requirements of warfighters are fully integrated into ongoing transformation activities outside the Army and DOD. Within these activities, Army intelligence concepts are integrated into joint doctrinal development through coordination with TRADOC and USJFCOM.

Army intelligence doctrine will expand to emphasize information exploitation to improve the Army's ability to identify a target on the battlefield and to communicate that information quickly to the warfighter for action. In addition, it supports the overall JFC's precision application of effects.

A focal point of DOD's thrust to fully exploit network-centric warfare is the development of persistent surveillance. In support to this goal, the Army will develop supporting persistent surveillance capabilities throughout the global battlespace. This provides the commander near-continuous access to the priority intelligence targets. The objective is to develop network-sensing suites that tailor their observations to the adversary's rate of activity. The goal is to combine the broad spectrum of current and future sensors into an effective intelligence tool that is geared to the activity of an adversary. The amassed information is input into an Internet protocol where it is universally available to all warfighters. This approach involves a paradigm shift in how raw data is entered into the network. Instead of analysts processing raw data into information for input into the network, the raw data will be placed on the network for empowered users to exploit for their own particular requirements. The decision on what is important moves from the entity that captures or analyzes the data to the person who uses it.

ORGANIZATION

The Army intelligence structure must be tailored to address 21st Century adversaries. Integrating with the GIG, Army intelligence provides the intelligence and environmental input

to the joint COP and Running Estimates. This provides universal visibility of assets, horizontal and vertical integration, and situational understanding, linking every Soldier as a contributor and consumer to analytic centers. The fundamental characteristics of this framework are interoperability, support to new methods of warfighting, and adaptability across a wide variety of threats.

The Army transforms CI and HUMINT to correct the deficiencies evidenced in recent real world operations. The CI and HUMINT force will become more tactically oriented, provide more focused tasking and relevant reporting, and ensure that information is cross-cued with other collectors to include non-intelligence specific human collectors. Intelligence Transformation ensures CI and HUMINT forces are better trained to routinely interact with open source intelligence (OSINT), document exploitation (DOCEX), linguists and all source analysts, in order to protect the force and shape the environment.

Army intelligence transforms those organizations that play a critical part in maintaining the linkage between tactical forces and intelligence organizations at the operational and strategic levels. The Army's Intelligence and Security Command (INSCOM) is one such organization. The transformation of INSCOM into an operational headquarters represents one of the major initiatives within Army Intelligence Transformation. INSCOM conducts intelligence, security and information operations for military commanders and national decision makers. Through its four geographically oriented theater intelligence brigades/groups, INSCOM supports the specific needs of combatant commanders for I&W, CI and force protection, electronic warfare, information operations, support to contingency or combat operations, intelligence preparation of the battlefield, single and multi-discipline intelligence analysis, and S&T intelligence production. The intelligence products and data developed in these efforts are integrated into the intelligence product libraries and intelligence databases that permit tactical

units to rapidly respond to crises with no cold starts.

INSCOM has eight other worldwide groups or activities that focus primarily on a single intelligence discipline or function. These organizations are available in a reinforcing role, enabling any combatant commander to use INSCOM's full range of unique capabilities, such as intelligence support to information operations.

The INSCOM Information Dominance Center monitors potential trouble spots worldwide and prepares to support contingency operations with IO-related products, should the need arise.

INSCOM's National Ground Intelligence Center (NGIC) supports the Joint Force by providing scientific and technical intelligence (S&TI) and general military intelligence (GMI) on foreign ground forces. The NGIC also manages the Army's Foreign Materiel Exploitation Program and foreign materiel acquisition requirements and constitutes a single authoritative source for comprehensive ground forces threat to the Army and other Services. INSCOM also has major responsibilities in the areas of CI and force protection, electronic warfare and information warfare, and support to force modernization and training managers with a wide range of current and futures-oriented ground capabilities assessments.

TRAINING

Army Intelligence Transformation trains its military and civilian workforces by improving the Army's ability to teach analysts "how to think" and "how to do" vice "what to think." More importantly, Intelligence Transformation expands the Army's intelligence training to include Soldiers who have not previously been considered part of the intelligence force. As the Army adopts the position of "every Soldier a collector and consumer of intelligence," the Army will develop programs of instruction for integration into the curriculum of all TRADOC schools.

The Army reshapes training to provide the volume, variety and velocity of intelligence col-lection and analysis and non-intelligence reporting to stress the intelligence and operations systems in a Joint SASO and MCO environment. At the combat training centers, the Army improves intelligence play to ensure commanders and Soldiers receive the same type of support provided during real-world operations.

For the civilian workforce, Army intelligence is exploring the development of a professional education system similar to the officer and non-commissioned officer programs. Army intelligence is developing certification requirements linked to advancement and levels of responsibility.

MATERIEL

Army intelligence enhances tactical echelons—provides robust, flexible, modular, all-source collection and analytical capabilities, born joint, and part of a tactical force—capable of independent action but empowered by linkages to a global grid and analytic and collection overwatch. These enhancements change the emphasis from reconnaissance to persistent surveillance, giving the Joint Force the ability to strike at a time and place of its own choosing, with surprise. This requires surveillance on demand—fused with other systems—that integrates information and provides decision superiority.

Army intelligence integrates rapid technology prototyping into the transformation process. Army intelligence develops an agile technology enterprise that enables the intelligence force to respond to a learning enemy with the best technical solutions available in real time.

- Army intelligence supports Effects Based Operations (EBO). Army ISR provides the capabilities to identify critical targets, measure and monitor the progress of those targets, and provide indications of effectiveness for Joint Force effects-based campaigns through a combination of programs and initiatives. To cite but a few, Army ISR:

– Develops and promulgates doctrinal concepts that are predicated on intelligence core competencies

– Sustains and modernizes existing systems through service life extension programs, advanced technology integration, and pre-planned product improvements

– Develops requirement statements, builds, tests and procures new systems

– Organizes, trains, mans and equips intelligence and non-intelligence units that support intelligence, surveillance and reconnaissance missions

– Participates in the development of and complies with DOD and commercial standards that permit exchange of data and information horizontally and vertically within the Army and within the joint, interagency, and multinational communities to enable commanders to achieve dominant situational understanding

Key Army programs and initiatives supporting these efforts include the DCGS-A, the Aerial Common Sensor, the family of Unmanned Aerial Vehicles (UAV), Prophet, Comanche, and Sentinel Radar. In the future, these systems, when integrated with other Army, joint, interagency, and multinational collection capabilities, form a ubiquitous, integrated, and networked sensor grid that provides the commander persistent surveillance throughout the battlespace. Chapter 8 and Annex B discuss these systems in greater detail.

FACILITIES

Home Station Operations Centers support contingency operations across the spectrum of conflict while also supporting day-to-day peacetime military operations. As part of the Army's overall facilities plan, Army Intelligence Transformation upgrades and recapitalizes institutional and organization training facilities to enhance force protection and improve the exchange of intelligence information. Army intelligence is also investigating the integration of dedicated collective training centers for all Military Intelligence entities at each Combat Training Center.

This chapter described specific transformational initiatives required by the TPG. Addressed within each initiative were the Army initiatives and systems necessary to achieve Joint transformational capabilities. Those transformational initiatives and systems are in full support of DOD and Joint Transformation. The next chapter details the Army's programs that support Defense Transformation and demonstrate the interdependence of Army and Joint Force capabilities.